4/91
Lynx
Lynx canadensis

Range:
Lynx occupy the boreal forests of North America and the spruce, subalpine fir and lodgepole pine forests in the West. They occur from Newfoundland, Labrador, and Quebec on the east to Alaska and British Columbia on the west; from the Arctic treeline south into portions of the United States.

Never a common animal in the contiguous United States, lynx may be found in northern New England (Godin 1977), the northern portions of the Lake States (Gunderson 1978, Mech 1973), parts of the Pacific Northwest (Ingles 1965, Hoffman et al. 1969, Nellis 1971) and the Rocky Mountains south to Utah (Durrant 1952) and Colorado (Miller 1980).

Washington Distribution:
In Washington, they occur in favorable habitats above 1,000 m (4.500') elevation in Chelan, Okanogan, Ferry, Stevens, and Pend Oreille counties (Brittell et al. 1989).

Habitat Requirements:
The lynx is a specialized carnivore and its survival depends on a small number of prey species, particularly the snowshoe hare (Van Zyll de Jong 1966). This dependency significantly influences lynx population dynamics. During times of hare abundance, lynx reproduction is high, mortality is low and densities are high; during times of low hare abundance, lynx reproduction is low, mortality is high, and densities are low (Berrie 1973, Brand and Keith 1979, Parker et al. 1983, O'Connor 1984). Dependency of lynx on hare also influences lynx home range size as lynx must increase movement when hare densities are low. Lynx are territorial with the mean home range size in Washington of 60 sq km and a range of 20 to 300 sq km (24 sq mi, range 8 to 120 sq mi) (Brittell et al. 1989).

Habitat conditions which are good for snowshoe hare benefit lynx. Snowshoe hare prefer dense, early successional habitats with high habitat interspersion (Bittner and Rongstad 1982). The general trend in the seasonal food habits of hares is from woody browse, bark and needles during winter to more succulent herbaceous vegetation in the summer (Wolff 1980, Bittner and Rongstad 1982). Of critical importance during winter are small diameter twigs and new growth (less than 1 cm or 0.4" in diameter); larger stems may be eaten when conditions become harsh and vegetation is covered by snow (Wolff 1980). Hardwoods are preferred but when not readily available hares feed on conifers (Conroy et al. 1979, Peitz and Tester 1983). In Northeastern Washington, hares concentrate on tips of lodgepole pine seedlings and bark from lodgepole pine trees. Trees must be 2 to 3 m (6 to 8') tall to provide browse when snows are 1 m (3 to 4' deep) (Wolff 1980).

Dense thickets used by hares provide protective cover from mammalian and avian predators and shelter from the elements (Keith 1963, Wolff 1980, Pietz and Tester 1983). Dense stands with 4,700 to 13,490 stems/acre provide these needs (Brocke 1975, Wolff 1980, Litvaitus et al. 1985, Monthey 1986, Koehler 1990). Thickets also provide stalking conditions for lynx.

On the other end of the forest successional spectrum, lynx need mature forests for denning. In Washington, denning sites are typically in lodgepole pine, spruce, and subalpine fir forests older than 200 years, with north and northeast aspects, mesic habitat associations, and a high density of down-fall logs (Koehler 1990). Denning areas must be connected by corridors of vegetative cover to prey habitat because lynx often avoid open areas (Brittell et al. 1989).

Limiting Factors:
The major limiting factor is snowshoe hare abundance, which, in turn, is limited by availability of winter habitat. Excessive trapping and hunting can depress populations and may have been detrimental to local Washington lynx populations.

Management Recommendations:
Converting mature timber stands to early stages of plant succession will benefit lynx by creating conditions favorable to hare. However, clearcutting has the potential to eliminate cover over large areas. Management practices should provide a mosaic of forest age classes distributed over time and space. An even balance of forest age classes must be maintained. This would be represented by an equal amount of grass-forb-seedling, sapling, and pole- small saw timber cover types. Natural openings should be considered as part of the grass-forb-seedling type. Forest management may include timber harvesting, thinning or fire management (Brittell et al. 1989).

Mature lodgepole pine and old-growth (150-250 years) subalpine fir and Engelmann spruce stands in north or northeast aspects must be provided for denning cover. They should be 0.4 to 2 ha (1 to 5 acres) in size, interspersed among other cover types, contain high density of down-fall logs within 5.5 km (3.5 mi) of prey habitat, and located away from areas of significant human disturbance. The density of logs should be greater than 40 logs/45 m (150') lying 0.3 to 1.2 m (1 to 4') above ground (Brittell et al. 1989, Koehler and Brittell 1990).

All habitat components must be contiguous via travel corridors, as lynx avoid openings greater than 90 m (300'). Tree density should be more than 70 stems/ha (180 stems per acre) and the height must be at least 2 m (6') in height to satisfy cover requirements (Brittell et al. 1989, Koehler and Brittell 1990).

Managed units should be 8 to 16 ha (20-40 acres) in size with irregular shapes. During reforestation, site preparation should encourage regrowth of lodgepole pine and other native vegetation. Trees on units should reach at least 2 m (6') in height before harvesting or thinning adjacent areas (Brittell et al. 1989, Koehler

and Brittell 1990).

Cattle grazing should be monitored to minimize impacts to hare habitats since cattle may compete with hare use of deciduous brush or trees, such as along riparian areas. Minimum human access and disturbance can be contolled by road management, including: minimize road miles; construct dead-end roads, rather than loop; build roads to minimum standards to allow regeneration after timber sale; close unused mainstems with gates or traps; and rip or replant spurs (Brittell et al. 1989).

References:

Berrie, P.M. 1973. Ecology and status of the lynx in Interior Alaska. Pages 4-41 in R.L. Eaton, ed. The world's cats, Vol. 1 World Wildl., Safari, Winston, Oregon. 349 pp.

Bittner, S.L., and O.J. Rongstad. 1982. Snowshoe hare and allies. Pages 146-163 in J.A. Chapman and G.A. Feldhamer, eds. Wild mammals of North America. John Hopkins Univ. Press, Baltimore, Md. 1,147 pp.

Brand, C.J. and L.B. Keith. 1979. Lynx demography during a snowshoe hare decline in Alberta. J. Wildl. Manage. 43:827-849.

Brittell, J.D., R.J. Poelker, S.J. Sweeney, and G.M. Koehler. 1989. Native cats of Washington - Section III: Lynx. Washington State Dept. Wildl. Olympia, Wash.

Brocke, R.H. 1975. Preliminary guidelines for managing snowshoe hare habitat in the Adirondacks. Trans. Northeast Wildl. Soc. Fish and Wild. Conf. 32:46-66.

Conroy, M.J., L.W. Gysel, and G.R. Duderar. 1979. Habitat components of clear-cut areas for snowshoe hares in Michigan. J. Wildl. Manage. 43:680-90.

Durrant, S.D. 1952. Mammals of Utah. Univ. Kansas Publ. Mus. Nat. Hist. 6:1-549. (As cited in McCord and Cardoza 1982).

Godin, A.J. 1977. Wild mammals of New England. Johns Hopkins Press, Baltimore. 304 pp.

Gunderson, H.L. 1978. A mid-continent irruption of Canada lynx, 1962-63. Prairie Nat. 10:71-80.

Hoffman, R.S., P.L. Wright, and F.E. Newby. 1969. The distribution of some mammals in Montana. Part 1: Mammals other than bats. J. Mammal. 50(3):579-604.

Ingles, L.G. 1965. Mammals of the Pacific States. Stanford Univ. Press, Stanford, Calif. 506 pp.

Keith, L.B. 1963. Wildlife's ten-year cycle. Univ. Wis. Press, Madison. 201 pp.

Koehler, G.M. 1990. Demographic and habitat characteristics of lynx and snowshoe hares in north- central Washington. Can. J. Zool. 68:845-51.

_____, and J.D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. J. Forestry. 88(10):10-14.

Litvaitis, J.A., J.A. Sherburne, and J.A. Bisonette. 1985. Influence of understory characteristics on snowshoe hare habitat use and density. J. Wildl. Manage. 49:866-73.

McCord, C.M., and J.E. Cardoza. 1982. Bobcat and lynx. Page 728-766 in J.A. Chapman and G.A. Feldhammer, eds. Wild mammals of North America. John Hopkins Univ. Press, Baltimore, Md. 1,147 pp.

Mech, L.D. 1973. Canada lynx invasion of Minnesota. Biol. Conserv. 5:151-152.

Miller, G.C. 1980. Lynx and wolverine verification. Job final report for 1 July 1978 through 30 June 1980. SE-3 Proj. No. SE-3-3. Colorado Wildl. Comm. 53-66.

Monthey, R.W. 1986. Responses of snowshoe hares. Lepus americanus, to timber harvesting in northern Maine. Can. Field-Nat. 100:568-70.

Nellis, C.H. 1971. The lynx in the northwest. Pages 24-28 in S.E. Jorgensen and L.D. Mech, eds. Proceedings of a symposium on the native cats of North America: their status and management. U.S. Bur. Fish and Wildl. Service, Washington D.C. 139 pp.

O'Conner, R.M. 1984. Population trends, age structure, and reproductive characteristics of female lynx in Alaska, 1961 through 1973. M.S. Thesis Univ. Alaska. Fairbanks. 111 pp.

Parker, G.R., J.W. Maxwell, L.D. Morton, and G.E.J. Smith. 1983. The ecology of the lynx (lynx canadensis) on Cape Breton Island. Can. J. Zool. 61:770-786

Pietz, P.J., and J.R. Tester. 1983. Habitat selection by snowshoe hares in north central Minnesota. J. Wildl. Manage. 47(3):686-696.

Van Zyll de Jong, C.G. 1963. The biology of the lynx, Felis (Lynx) canadensis (Kerr) in Alberta and the MacKenzie District, N.W.T. M.S. Thesis. Univ. Alberta, Edmonton. 76 pp.

Wolff, J.O. 1980. The role of habitat patchiness in the population dynamics of snowshoe hares. Ecol. Monogr. 50(1):111-130.

Key Points:

Habitat Requirements:

- Habitat conditions which are good for snowshoe hare benefit lynx.
- Snowshoe hare prefer dense, early successional habitats with high habitat interspersion.
- Vegetation must be 6 to 8' tall to provide browse when snows are deep.
- Thickets provide stalking conditions for lynx.
- Lynx need mature forests for denning.
- Denning areas must be connected by corridors of vegetation cover to prey since lynx avoid open areas.

Management Requirements:

- Management practices should provide a mosaic of forest age classes distributed over time and space.
- Converting mature timber stands to early stages of plant succession must not occur too rapidly. Clearcutting has the potential to eliminate cover over large areas.
- Overmature timber stands must be provided for denning cover. They should be 5 acres in size, contain high density of downfall logs, and interspersed amongst other cover types.
- Managed units should be 20 to 40 acres in size.
- During reforestation, lodgepole pine and other native vegetation should be encouraged in dense, solid stands. Stands must reach a height of 6 to 8' before adjacent stands are cut.
- Cattle grazing should be regulated to minimize negative impacts to snowshoe hare habitats.
- Minimize human access.